

AN EVALUATION OF CORONARY ARTERY DISEASE BY CORONARY ANGIOGRAPHY IN TMT POSITIVE FEMALE PATIENTS

Bushra Khanam¹, Rishu Bansal², Aastha Bansal³

¹Assistant Professor, Department of General Medicine, Index Medical College Hospital and Research Centre, Indore.

²Postgraduate Student, Department of General Medicine, Index Medical College Hospital and Research Centre, Indore.

³Postgraduate Student, Department of General Medicine, Index Medical College Hospital and Research Centre, Indore.

ABSTRACT

BACKGROUND

Coronary Artery Disease (CAD) is one of the leading causes of mortality and morbidity in the world. It is now equally prevalent in developed and developing nations. Treadmill Test (TMT) remains a cost effective, easily available and widely applicable approach for early diagnosis of CAD, but has a relatively low sensitivity and specificity. Identification of CAD in women can be a diagnostic challenge because of several factors including the lower prevalence of obstructive CAD in women younger than 65 years, more atypical manifestations of ischaemic symptoms and more frequent resting ST changes.

MATERIALS AND METHODS

This study was conducted on 50 TMT positive female patients at Internal Medicine Department of Index Medical College Hospital and Research Centre, Indore. Patients were categorised into low, intermediate and high pretest probable groups on the basis of pretest probability score system. These patients were subjected to coronary angiography and the prevalence of CAD was analysed by using descriptive statistical methods.

RESULTS

Out of 50 TMT positive female patients, 12 were having CAD on angiography (24%) indicating a low predictive value of TMT in females. The prevalence of CAD was 70% in high pretest probability group compared to 5% in low pretest probability group indicating high predictive value of TMT in high pretest probability group. Single vessel disease was the most common (58%) followed by triple vessel disease (25%) and double vessel disease (17%).

CONCLUSION

TMT has a low predictive value for detecting CAD in female patients except those with a high pretest probability score.

KEYWORDS

Coronary Angiography, TMT, CAD (Coronary Artery Disease).

HOW TO CITE THIS ARTICLE: Khanam B, Bansal R, Bansal A. An evaluation of coronary artery disease by coronary angiography in TMT positive female patients. *J. Evid. Based Med. Healthc.* 2017; 4(25), 1460-1462. DOI: 10.18410/jebmh/2017/283

BACKGROUND

Coronary Artery Disease (CAD) is one of the leading causes of mortality and morbidity in the world. Earlier thought to be a disease of the Western Nations, it is now equally prevalent in developed and developing nations.¹ Treadmill Test (TMT) remains a cost effective, easily available and widely applicable approach for early diagnosis of CAD, but has a relatively low sensitivity (80%) and specificity (70%), especially in single and two vessel disease. Identification of CAD in women can be a diagnostic challenge because of several factors, including the lower prevalence of obstructive CAD in women younger than 65 years, more atypical

manifestations of ischaemic symptoms and more frequent resting ST changes.²

TMT in women have a relatively low diagnostic yield for CAD compared with men, especially when symptoms are atypical or nonspecific.^{3,4} The reported sensitivity and specificity of exercise electrocardiographic testing in symptomatic women vary greatly depending on the study characteristics and range from 31% to 71% and 66% to 86%, respectively.⁵

Women tend to have a greater release of catecholamines during exercise, which could potentiate coronary vasospasm and augment the incidence of abnormal exercise results. False positive results have been reported to be more common during menses and preovulation.⁶ Data from a meta-analysis depicting a specificity of 70% suggests false positivity of around 30% in TMT positive patients.³

Coronary angiography is used to establish the presence or absence of coronary artery stenosis due to CAD. This provides the most reliable anatomical information for definite therapeutic options.

Financial or Other, Competing Interest: None.

Submission 18-02-2017, Peer Review 24-02-2017,

Acceptance 08-03-2017, Published 24-03-2017.

Corresponding Author:

Dr. Rishu Bansal,

No. 73, Nayagaon Housing Society,

Rampur, Jabalpur-482008, Madhya Pradesh.

E-mail: rishuban1507@gmail.com

DOI: 10.18410/jebmh/2017/283



Aims and Objectives

To analyse the coronary artery profile on Coronary Angiography (CAG) in TMT positive female patients.

Study Design

The study was an observational cross-sectional study.

Aim of the Study

To analyse the coronary artery profile on Coronary Angiography (CAG) in TMT positive female patients.

Statistical Analysis

SPSS 20.0 software was used to analyse the data. It was shown as mean ± SD. A one-way ANOVA was used to determine differences among the group means. Differences at p<0.05 were considered significant. The accuracy rate among the groups was analysed with the Chi-square test. Univariate and multivariate logistic regression analysis were applied to study the relationship of multiple risk factors with CAD diagnosis.

MATERIALS AND METHODS

This study was conducted on 50 TMT positive female patients at Internal Medicine Department of Index Medical College Hospital and Research Centre, Indore.

Inclusion Criteria

- TMT positive females who gave consent for coronary angiography and were able to afford it.

Exclusion Criteria

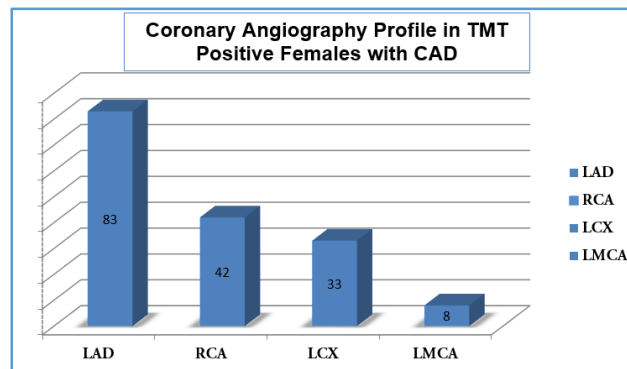
- Males.
- TMT negative females.
- TMT positive females who did not give consent for coronary angiography or could not afford the procedure.

Patients were categorised into low, intermediate and high pretest probable groups on the basis of pretest probability score system. These patients were subjected to coronary angiography and the prevalence of CAD was analysed by using descriptive statistical methods.

RESULTS

Out of 50 TMT positive female patients, 12 were having CAD on angiography (24%) indicating a low predictive value of TMT in females. The prevalence of CAD was 70% in high pretest probability group compared to 5% in low pretest probability group indicating high predictive value of TMT in high pretest probability group. Single vessel disease was the most common (58%) followed by triple vessel disease (25%) and double-vessel disease (17%).

Left Anterior Descending (LAD) artery disease was seen in 83% followed by Right Coronary Artery (RCA) 42%, Left Circumflex Artery (LCA) 33%, Left Main Coronary Artery (LMCA) in 8%. Hypertension, diabetes mellitus, obesity, sedentary lifestyle and postmenopausal status were the most common associated risk factors.



Coronary Angiography Profile in TMT Positive Female with CAD

	Low Probability	Intermediate Probability	High Probability
Number of Patients	18	22	10
CAD	1	4	7
SVD	0	2	5
DVD	0	1	1
TVD	1	1	1

Table 1. Prevalence of CAD by Pretest Score

p value >0.05 (nonsignificant).

Risk Factor	Score
Age	
<50	03
50-60	06
>65	09
Symptoms	
Typical angina	05
Atypical angina	03
Nonspecific chest pain	01
Co-Morbid Illness	
Diabetes mellitus	02
Hypertension	01
Obesity	01
Dyslipidaemia	01
Smoking	01
Oestrogen Status	
Positive	03
Negative	-03
Total Probability Score	
Low	06 to 08
Intermediate	09 to 15
High	16 to 24

Table 2. Pretest Score Method

DISCUSSION

Coronary artery disease is one of the leading cause of mortality and morbidity worldwide. Hypertension, diabetes mellitus, smoking, obesity, dyslipidaemia, insulin resistance states, syndrome X, obstructive sleep apnoea, hyperhomocysteinaemia and strong family history are

known risk factors for CAD. Coronary artery disease is not curable, but is preventable and treatable. Modifications of lifestyle and prevention of risk factors has shown a dramatic decline in incidence of CAD.

TMT is a cardiovascular stress test using treadmill bicycle exercise with ECG, blood pressure and heart rate monitoring. Contraindications for TMT are acute myocardial infarction, symptomatic heart failure, acute arrhythmia, symptomatic aortic stenosis, aortic dissection, accelerated hypertension (BP >200/110) and AV blocks. The diagnostic accuracy of exercise testing varies depending upon the age, gender and clinical characteristics of the patient, prevalence of CAD and modality of test used. Exercise testing whether by echocardiography or ECG is more useful at excluding CAD than confirming it.⁷

Atypical chest pain is not only more common among women than men, but the predictive value of traditional risk factors is also different for women and men.⁸ Symptomatic women who have a positive test have a lower probability of CAD than men and have fewer coronary events. Exercise stress test has been reported to have a sensitivity of 70% and specificity of 61% for the detection of CAD in women.³ In a review of nine studies correlating exercise-induced ST segment changes with angiographic findings in female patients, the prevalence of CAD ranged from 18% to 40%. In our study, the prevalence of angiography documented CAD (>1 vessel, stenosis >50%) was 24%.

In our study of 100 female patients, 62% belonged to rural areas, but among those patients of angiography documented CAD 70% belonged to urban areas indicating sedentary life as an important risk factor for CAD. In a study by Morise and Beckner,⁹ 60% of patients had CAD on angiography belonging to high probability group compared with 40% with intermediate group and 16% in low pretest probability group. In our study, the incidence of CAD was 70% in high pretest probability group compared to 5% in low pretest probability group.

In a study by Tartanoglu et al,¹⁰ 120 postmenopausal females with typical angina or atypical chest pain underwent TMT of which 110 had undergone angiography. A positive predictive value of 78% and a negative predictive of 80% were determined. Single Vessel Disease (SVD) was found to be the most common form of CAD. In our study, single

vessel disease was seen in 58% consistent with the above study.

CONCLUSION

TMT has a low predictive value for detecting CAD in female patients except those with a high pretest probability score.

REFERENCES

- [1] Celermajer DS, Chow CK, Marijon E, et al. Cardiovascular disease in the developing world: prevalences, patterns and the potential of early disease detection. *J Am Coll Cardiol* 2012;60(14):1207-1216.
- [2] Balady G, Morise A. Exercise testing. Chapter. 13. In: Mann DL, Zipes DP, Libby P, et al, eds. Braunwald's heart disease, a textbook of cardiovascular medicine. 10th edn. Philadelphia: Elsevier 2015:p. 166.
- [3] Junker J, Meyer A, Flake D. Is exercise treadmill testing useful for detecting heart disease in women? *Journal of Family Practice* 2004;53(4):308-331.
- [4] Kwok Y, Kim C, Grady D, et al. Meta-analysis of exercise testing to detect coronary artery disease in women. *Am J Cardiol* 1999;83(5):660-666.
- [5] Kohli P, Gulati M. Exercise stress testing in women: Going back to the basics. *Circulation* 2010;122(24):2570-2580.
- [6] Glaser, Clark. Interpretation of exercise test results in women. *Practical Cardiol* 1998;14:85-95.
- [7] Banerjee A, Newman DR, Van den Bruel A, et al. Diagnostic accuracy of exercise stress testing for coronary artery disease: A systematic review and meta-analysis of prospective studies. *Int J Clin Pract* 2012;66(5):477-492.
- [8] DeCara JM. Noninvasive cardiac testing in women. *J Am Med Womens Assoc* (1972) 2003 Fall;58(4):254-263.
- [9] Morise AP, Haddad WJ, Beckner D. Development and validation of a clinical score to estimate the probability of coronary artery disease in men and women presenting with suspected coronary disease. *Am J Med* 1997;102(4):350-356.
- [10] Cin VG, Tartanoglu O, Duzenli A, et al. The use of basic clinical and exercise variables in postmenopausal women for the diagnosis of coronary artery disease. *International Journal of Angiology* 2000;9(3):135-137.